

TPPSEC

Application No. 74-1 (Skagit)

NPDES Permit and Section 401 Certification HearingEXHIBITS

<u>Number</u>	<u>Description</u>	<u>Identified</u>	<u>Admitted</u>
1.1	Resume of Fredrick M. Berthrong	1:25	1:57
1.2	Resume of Jonathan P. Houghton	1:26	3:549
1.3	Resume of Allyn H. Seymour	1:26	8:1592
1.4	Resume of Bronislaw S. Shicker	2:412	2:412
1.5	Resume of Herbert H. Druebert	3:541	3:542
1.6	Resume of Ranjit K. Chakravorti	5:919	5:920
1.7	Resume of Barry A. Scott	6:1045	6:1066
1.8	Resume of Richard J. Tosetti	7:1304	7:1306
2	Map entitled Plant Site Creeks	1:26	1:83
2A	Aerial Infrared Photograph of Plant Site Area, taken June 1974	1:26	4:753
2B	Black and White Photograph of the Skagit River Proposed Diffuser Site	1:27	3:683
2C	Oblique Aerial Photograph of Pipeline and Transmission Crossings taken April 28, 1975	3:681	3:683
2D	Oblique Aerial Photograph of River Channel, taken April 28, 1975	3:681	3:683
3	Map entitled Storm Runoff Discharge Points 002 to 005	1:27	1:83
4	Diagram entitled Sediment Retention Barrier Details	1:28	1:93
5.1	Skagit River Water Quality Information	1:28	4:750
5.1A	Skagit River Water Quality Information (revised)	4:735	4:750

<u>Number</u>	<u>Description</u>	<u>Identified</u>	<u>Admitted</u>
5.2	Supplemental Water Quality Parameters	1:28	4:750
5.3	Natural Temperature and Flow Variations in the Skagit River Near the Proposed Diffuser Location	1:28	4:750
5.4	Timing of Salmon and Searun Trout, Fresh Water Life Phases in Skagit Basin	1:29	4:750
5.5	Summary of Dames & Moore Water Quality Data	7:1275	7:1277
6	Skagit River Cross-section at Diffuser	1:29	6:1066
7	Average Dilution, 10-year, 7-day Low River Flow, 4740 cfs	1:29	6:1066
8	Summer Conditions, 10-year, 7-day Low River Flow, 4740 cfs	1:29	6:1066
9	Winter Conditions, 10-year, 7-day Low River Flow, 4740 cfs	1:30	6:1066
10	Dilution of Project Discharge in Skagit River	1:30	6:1066
11	Map entitled Bechtel, Location of Water Well Springs, TPPSEC Fig. L-7	1:288	1:302
12	Large Scale photograph introduced by Helen Day	1:289	1:302
13	Mr. Blohm's drawing of Diversion Channel Cross-section	2:471	2:477
14	Dr. Houghton's sketch for illustrative purposes of Upper Tank Creek	3:598	3:659
15	Fish Facility Contribution to the Project Discharge	5:854	5:877
16	Memorandum, Mr. Roy Nakatani, a two-page document	5:855	5:877
17	Model for Radioactive Gaseous Effluent Pathway to Project Discharge	7:1304	7:1323

<u>Number</u>	<u>Description</u>	<u>Identified</u>	<u>Admitted</u>
18	Incremental Increase in Radio-activity Due to Project Offgas to Cooling Tower to Skagit River Pathway	7:1304	7:1342
19	Incremental Dosage to Man Due to Project Offgas to Cooling Tower to Skagit River Pathway	7:1304	7:1339
20	Guidelines for the Establishment of Dilution Zones	6:1173	7:1221
21	Industrial General Conditions	6:1173	7:1221
22	Municipal General Conditions	6:1173	7:1221
23	Excerpts from "Fisheries Handbook of Engineering Requirements and Biological Criteria" by Milo C. Bell, Fisheries-Engineering Research Program, Corps of Engineers, North Pacific Division, Portland, Oregon, February, 1973	Late-filed exhibit 7:1435	7:1435
24	Letter dated May 30, 1975 from Attorneys for Applicant to Wayne L. Williams, Counsel for the Environment, and attached table entitled "Supplemental Total Coliform Data from the Skagit River"	Late-filed exhibit 8:1563-64, 1567	
25	Pages 77-83 from Battelle publication "Pacific Northwest Laboratory Annual Report for 1973 to the USAEC Division of Biomedical and Environmental Research," January, 1974	Late-filed exhibit by SCANP	
26	Additional pages from "Water Quality Criteria 1972"	Late-filed exhibit by SCANP	

TPPSEC

Application No. 74-1 (Skagit)

NPDES Permit and Section 401 Certification HearingDOCUMENTS OFFICIALLY NOTICED

<u>Number</u>	<u>Description</u>	<u>Identified</u>	<u>Noticed</u>
1.	Applicant's NPDES Application dated April 4, 1974, as amended February 28, 1975	1:32-33	1:36
2.	The Draft NPDES Permit for the Skagit Project, as adopted by the Council at its meeting March 10, 1975	1:32-33	1:36
3.	Applicant's Application No. 74-1 for Site Certification for the Skagit Nuclear Power Project, as revised through Revision 7 Thereto, dated May 2, 1975	1:32-33	1:36
4.	39 Federal Register 36186-36207, October 8, 1974 (40 CFR 423, Steam Electric Power Generating Point Source Category) and 40 Federal Register 7095-7096, February 19, 1975 (correction to 40 CFR 423)	1:32-33	1:36
5.	The following pages from <u>Water Quality Criteria 1972</u> , A Report of the Committee on Water Quality Criteria, Environmental Studies Board, National Academy of Sciences, National Academy of Engineering, Washington, D. C., 1972: 126-129, 178, 180-182, 189	1:32-33	1:36
6.	Water Quality Standards for Waters of the State of Washington, WAC 173-201	1:32-33	1:36
7.	40 CFR 128, Pretreatment Standards (38 Federal Register 30982, November 8, 1973).	1:32-33	1:36

<u>Number</u>	<u>Description</u>	<u>Identified</u>	<u>Noticed</u>
8.	Letters from Department of Ecology (Sylvester) to Thomsen dated April 2, and April 23, 1975	1:32-33	1:36
9.	Publication entitled "Guidelines for Erosion and Sediment Control Planning and Implementation" issued by the U.S. Environmental Protection Agency, EPA R2-72-015, August 1972	1:119-20	1:123
10.	A. Agenda and Minutes for the Following meetings of the Council: (1) January 27, 1975--agenda item 5 (2) February 18, 1975--agenda item 6 (3) February 24, 1975--agenda item 5 (4) March 10, 1975--agenda item 5 B. The Following letters from Attorneys for Applicant: (1) February 25, 1975 to Alfred G. Rode and Roger M. Leed (2) February 28, 1975 to the Council (3) March 5, 1975 to the Council (4) March 15, 1975 to Roger M. Leed		
11.	Opinion of the Nuclear Regulatory Commission, Docket No. RM-50-2, April 30, 1975	6:936-37	6:937
12.	Publication entitled "Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Steam Electric Power Generating Point Source Category" issued by the U.S. Environmental Protection Agency, EPA 440/1-74 029-a, October 1974	6:936-37	6:937
13.	NPDES Permit for WPPSS Nos. 1 and 4 (Hanford): (a) as approved April 28, 1975, and (b) as amended July 14, 1975	6:1174-76	6:1175
14.	Draft NPDES Permit for WPPSS Nos. 3 and 5 (Satsop), as adopted (tentative determination) February 24, 1975	6:1174-76	6:1175

APPENDIX C

Permit No. WA-002502-0

Issuance Date:

Expiration Date:

NATIONAL POLLUTANT DISCHARGE ELIMINATION
SYSTEM WASTE DISCHARGE PERMIT

State of Washington
Thermal Power Plant Site Evaluation Council
Olympia, Washington 98504

In Compliance With the Provisions of
Chapter 155, Laws of 1973, (RCW 90.48) as amended

and

The Federal Water Pollution Control Act Amendments of 1972,
Public Law 92-500

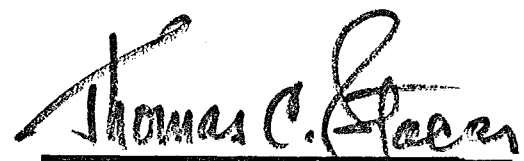
Puget Sound Power & Light Company
Puget Power Building
Bellevue, Washington 98009

Plant Location:	Sections 11, 12, 13 & 14 T. 35N, R5E, W.M. West of Lyman Skagit County, Washington	Receiving Water: See Page 2
		Discharge Location: See Page 2
Industry Type:	Nuclear Steam Electric Generating Plant (Skagit Units 1 & 2)	Waterway Segment No.: See Page 2

is authorized to discharge in accordance with the special and
general conditions which follow:

APPROVED: January 26, 1976

AMENDED: April 12, 1976


Acting Chairman
Thermal Power Plant Site
Evaluation Council

OUTFALL IDENTIFICATION

<u>Outfall</u>	<u>Receiving Water</u>	<u>Discharge Location</u>	<u>Water Segment No.</u>
001	Skagit River	Lat. 48°29'19"N Lo. 122°11'56"W	02-03-06
002	Wiseman Creek	Lat. 48°32' 5"N Lo. 122° 7'50"W	02-03-06
003	Tank Creek	Lat. 48°32' 5"N Lo. 122° 6'35"W	02-03-06
004	Tank Creek	Lat. 48°32' 5"N Lo. 122° 6'28"W	02-03-06
005	Tank Creek	Lat. 48°32' 6"N Lo. 122° 6'21"W	02-03-06

SPECIAL CONDITIONS

S.1 EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS FOR OUTFALL
DISCHARGE SERIAL NUMBER 001.

During the period beginning with the issuance of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge effluents from Outfall Discharge Serial Number 001 subject to the following limitations and monitoring requirements:

A. LOW VOLUME WASTE SOURCES PORTION OF DISCHARGE SERIAL NUMBER 001 (1)

<u>PARAMETER</u>	<u>EFFLUENT LIMITATIONS</u>			<u>MONITORING REQUIREMENTS</u> (2)	
	<u>Daily Maximum</u>	<u>Daily Average</u>		<u>Minimum Frequency</u>	<u>Sample Type</u>
Total Suspended Solids (lb/day) (3)	95.5	9.0		3 times per week	Grab
pH	Between 6.5 and 8.5 at all times			3 times per week	Grab
Oil and Grease (lb/day) (4)	19.1	4.5		Weekly	Grab
Flow (GPD)	0.114×10^6	0.036×10^6		Continuous	Instantaneous

Note (1) When only one generating unit is in operation, the effluent limitations on flow and the effluent loading limitations for total suspended solids, and Oil and Grease shall be half of the limitations specified above.

Note (2) Permittee shall monitor the effluent prior to confluence with other inplant streams.

Note (3) The maximum concentration of total suspended solids shall not exceed 100 mg/l at any time.

Note (4) The maximum concentration of oil and grease shall not exceed 20 mg/l at any time.

B. RECIRCULATED COOLING WATER BLOWDOWN PORTION OF DISCHARGE SERIAL NUMBER 001 PER UNIT

<u>PARAMETER</u>	<u>EFFLUENT LIMITATIONS</u>			<u>MONITORING REQUIREMENTS (1)</u>	
	<u>Daily Maximum</u>	<u>Daily Average</u>		<u>Minimum Frequency</u>	<u>Sample Type</u>
Temperature	Note (2)			Continuous	Instantaneous
Free Available Chlorine (lb/day)	Note (3) 0.79	0.32		Continuous (4)	Instantaneous
pH		Between 6.5 and 8.5 at all times		Continuous (5)	Instantaneous
Flow (GPD)	2.27 X 10 ⁶	2.27 X 10 ⁶		Continuous	Instantaneous

Limits Applicable to Total Residual Chlorine: The maximum concentration of total residual chlorine at the outfall shall not exceed 0.09 mg/l at any time. Continuous recording of total residual chlorine at a location downstream of the junction of all streams that make up the Project Discharge, during periods of active chlorination and thereafter until total residual chlorine reaches an undetectable level, is required. The Council may waive the requirement that Permittee monitor total residual chlorine upon a showing by Permittee that such total residual chlorine levels are substantially correlated with the levels of free available chlorine monitored at the exits from the cooling tower basins.

Note (1) Permittee shall monitor the effluent prior to confluence with other inplant streams.

Note (2) The temperature of the recirculated cooling water blowdown shall not exceed, at any time, the lowest temperature of the recirculated cooling water prior to the addition of the makeup water.

Note (3) For compliance, free available chlorine will be measured at and will be characteristic of the discharge of the unit being chlorinated. Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not from more than one unit at any one time.

Note (4) Continuous recording of free available chlorine during periods of active chlorination and thereafter until free available chlorine reaches an undetectable level is required.

Note (5) Permittee shall include an alarm system for the pH control to provide an indication of any variance from the established units.

C. HYDROSTATIC TESTING AND FLUSHING WASTES PORTION OF DISCHARGE SERIAL NUMBER 001 PER UNIT

<u>PARAMETER</u>	<u>EFFLUENT LIMITATIONS (1)</u>		<u>MONITORING REQUIREMENTS (2)</u>	
	<u>Daily Maximum</u>	<u>Daily Average</u>	<u>Minimum Frequency</u>	<u>Sample Type</u>
Total Suspended Solids (mg/l)	10	10	3 times per day when discharging	Grab
pH	Between 6.5 and 8.5 at all times		3 times per day when discharging	Grab
Flow (GPD)	0.1 X 10 ⁶		Each discharge	N/A

Note (1) No water contaminated with chemical cleaning agents shall be discharged.

Note (2) Permittee shall monitor the effluent prior to confluence with other inplant streams.

D. FISH FACILITY PORTION OF DISCHARGE SERIAL NUMBER 001

<u>PARAMETER</u>	<u>EFFLUENT LIMITATIONS</u>			<u>MONITORING REQUIREMENTS (1)</u>	
	<u>Daily Maximum</u>	<u>Instantaneous Maximum</u>	<u>Daily Average</u>	<u>Minimum Frequency</u>	<u>Sample Type</u>
<u>Total Discharge</u>					
Total Suspended Solids (lb/day)	2035	N/A	1544	Weekly	6-hr. composite
Total Suspended Solids (mg/l)	N/A	15	N/A	Weekly	Grab
pH	Between 6.5 and 8.5 at all times			Daily	Grab
Flow (GPD) (2)	6.5×10^6	---	6.5×10^6	Continuous	Instantaneous
Settleable Solids (3) (ml/l)	N/A	0.2	0.1	Weekly	Grab
Temperature	See Note (4)			Continuous	Instantaneous

Note (1) Permittee shall monitor the effluent prior to confluence with other implant streams.

Note (2) Value shown does not include blowdown flow. 6.48 MGD of uncontaminated dilution water may also be discharged.

Note (3) Bottom sludges from raceways and ponds shall be treated as solid wastes and disposed of as required in condition G-7.

Note (4) Recirculated cooling water discharged to the fish facility shall not exceed at any time the lowest temperature of the recirculated cooling water prior to addition of the makeup water.

S.2 EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS FOR OUTFALL
DISCHARGE SERIAL NUMBERS 002, 003, 004 and 005

During the period beginning with the issuance of this Permit and lasting until the expiration date of this permit, the permittee is authorized to discharge effluents from Outfall Discharge Serial Numbers 002, 003, 004 and 005 subject to the following limitations and monitoring requirements:

A. COLLECTED STORM RUN-OFF DRAINAGE OF DISCHARGE SERIAL NUMBERS 002, 003, 004 and 005

<u>PARAMETER</u>	<u>EFFLUENT LIMITATIONS (1)</u>	<u>MONITORING REQUIREMENTS</u>	
		<u>Minimum Frequency</u>	<u>Sample Type</u>
Total Suspended Solids	50 mg/l maximum	Once per day when there is discharge from the storm collector basins	Grab
pH	Between 6.5 and 8.5 at all times	Once per day when there is discharge from the storm collector basins	Grab

Note (1) These limits may be exceeded during periods when runoff volumes exceed those generated by a "10-year, 24-hour rainfall event" as defined in 40CFR 423.41(d). This has been determined to be 3.5" per 24 hours.

S.3 BOUNDARIES OF MIXING ZONES FOR OUTFALL DISCHARGE SERIAL
NUMBER 001

Outfall 001

- a. The boundaries in the vertical plane shall be one foot below the receiving water surface and one foot above the riverbed;
- b. The upstream and downstream boundaries shall be 10 feet and 100 feet, respectively, from the center line of the diffuser; and
- c. The lateral boundaries shall be 50 feet, respectively, from the center of the diffuser.

S.4 SPECIAL CONDITIONS APPLICABLE TO DISCHARGE OF SANITARY
SEWAGE INTO MUNICIPAL SEWERAGE SYSTEM OF THE CITY OF
SEDRO WOOLLEY, WASHINGTON

- a. Permit. Permittee is authorized to discharge sanitary sewage generated during the construction and operation of the Project to the municipal sewerage system of the City of Sedro Woolley, Washington.
- b. Discharge Location. The point(s) of discharge into the municipal sewerage system shall be at such location(s) as may be approved by the City of Sedro Woolley.
- c. Maximum Flow. The maximum flow of the discharge authorized herein shall be 50,000 gpd or such greater flow as may be authorized by the City of Sedro Woolley.
- d. Prohibited Wastes. The discharge authorized herein shall not include any "incompatible pollutant" as defined in 40 CFR 128.122 nor any waste prohibited by 40 CFR 128.131.
- e. Pretreatment Requirements. None, except as may be required to comply with 40 CFR 128.131.

f. Limitations and Monitoring Requirements.

1. Flow

Limitations: 0.05 mgd daily average
0.05 mgd daily maximum
(Subject to paragraph C, Maximum Flow, above).

Monitoring Requirements:

Minimum frequency - continuous
Sample type - instantaneous

2. Other Constituents

Limitation: Raw untreated sanitary sewage constituent concentrations (BOD, suspended solids, pH and fecal coliform) shall be within the ranges normally experienced for such wastes.

Monitoring Requirements:

Minimum frequency - monthly
Sample type - 6 hour composite

One copy of each monitoring report required under Condition G-27, to the extent it covers the discharge authorized herein, shall also be submitted to the City of Sedro Woolley.

- g. Plans and Specifications. All plans and specifications for the construction of the sewerage system extension or other facilities proposed for conveying the discharge authorized herein to the municipal sewerage system of the City of Sedro Woolley, and the proposed method of future operation and maintenance of said facilities, shall be submitted to and approved by the City of Sedro Woolley and the Council before construction thereof may begin.

GENERAL CONDITIONS

- G1. No discharge of polychlorinated biphenol compounds, such as transformer fluid is permitted. No discharge of materials added for corrosion inhibition including, but not limited to, zinc, chromium, and phosphorous is permitted.
- G2. All discharges and activities authorized herein shall be consistent with the terms and conditions of this Permit. Permittee is authorized to discharge those pollutants which are: (1) contained in the raw water supply, (2) entrained from the atmosphere, or (3) quantitatively and qualitatively identified in the Permit application; except as modified or limited by the special or general conditions of this Permit. However, the effluent concentrations in Permittee's waste water shall be determined on a gross basis and the effluent limitations in this Permit mean gross concentrations and not net addition of pollutants. The discharge of any pollutant more frequently than or at a level in excess of that authorized by this Permit shall constitute a violation of the terms and conditions of this Permit. No liquid radioactive waste shall be added to Project Discharge.

- G3. The radiological waste materials contained in the discharge from discharge point Serial Number 001, which are attributable to plant operation, shall never exceed the following calculated levels:

Isotope	Annual Average Release From Plant (Ci/yr)	Annual Average Release From <u>Cooling Tower</u> (Ci/yr)	Annual Average Concentration <u>At Cooling Tower Discharge</u> (μ Ci/cc)	Annual Average Concentration <u>Project Discharge</u> (μ Ci/cc)	Annual Average Concentration <u>After Mixing</u> (μ Ci/cc)
Mn-54	1.8E-6	1.71E-7	3.30E-14	7.4E-15	1.2E-17
Mn-56	2.3E-3	5.9E-6	1.13E-12	2.5E-13	4.1E-16
Fe-59	3.6E-6	3.29E-7	6.32E-14	1.4E-14	2.3E-17
Co-58	2.3E-4	2.13E-5	4.10E-12	9.2E-13	1.5E-15
Co-60	2.3E-5	2.19E-6	4.22E-13	9.5E-14	1.5E-16
Sr-89	1.0E-4	9.18E-6	1.77E-12	4.0E-13	6.3E-16
Sr-90	7.8E-6	7.41E-7	1.42E-13	3.2E-14	5.1E-17
Mo-99	7.8E-4	3.26E-5	6.30E-12	1.4E-12	2.3E-15
Ru-103	6.8E-7	6.17E-8	1.19E-14	2.7E-15	4.3E-18
Ru-106	8.7E-8	8.27E-9	1.59E-15	3.6E-16	5.7E-19
Cs-134	5.5E-6	5.23E-7	1.01E-13	2.3E-14	3.6E-17
Cs-136	3.6E-6	3.01E-7	5.80E-14	1.3E-14	2.1E-17
Cs-137	8.2E-6	7.79E-7	1.50E-13	3.4E-14	5.4E-17
Ba-140	3.1E-4	2.57E-5	4.94E-12	1.1E-12	1.8E-15
I-131	2.3E-2	1.78E-3	3.42E-10	7.7E-11	1.2E-13
I-133	8.4E-2	1.53E-3	2.94E-10	6.6E-11	1.1E-13
H-3	4.84	4.60E-1	8.86E-8	2.0E-08	3.2E-11

- G4. Permittee shall notify the Council no later than 120 days before the date of anticipated first discharge under this Permit.
- G5. Permittee shall not discharge any effluent which shall cause a violation of any applicable State of Washington Water Quality Criteria or standards contained in WAC 173-201, as they exist now or hereafter are amended, outside the boundaries of the applicable mixing zone described in Condition S.3 or inside said zone if in concentrations sufficient to cause biological shock.
- G6. The Permittee shall provide an adequate operating staff which is qualified and shall carry out the operation, maintenance, and testing activities required to insure compliance with the conditions of this Permit.
- G7. Permittee shall handle and dispose of all solid waste material from any waste retention basins or any other source in such a manner as to prevent their pollution of any ground or surface water body. Further, Permittee shall not permit leachate from such solid waste material to cause adverse effect on ground or surface water quality.
- G8. a. Whenever a facility expansion, production increase, process modification or other action, event or occurrence is anticipated which will result in a new or increased discharge, or which will cause any of the conditions of the Permit to be exceeded, a new NPDES Application must be submitted, together with the necessary reports and engineering plans for the proposed changes. No such change shall be made until plans have been approved and a new permit or permit modification has been issued.
- b. Permittee shall notify the Council of any anticipated action, event or occurrence which shall affect or modify the nature, character, composition, or constituents of effluent discharges prior to the occurrence of such action, event or occurrence even though, to the best of the Applicant's knowledge or belief, such action, event or occurrence shall not result in violation of effluent limitations specified in this Permit. The Council may in its discretion waive notification of recurring or insignificant changes.
- G9. If a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Federal Act for a toxic pollutant which is present in the Permittee's discharge and such standards or prohibition is more

stringent than any limitation upon such pollutant in this Permit, this Permit shall be revised or modified in accordance with the toxic effluent standard or prohibition and the Permittee shall be so notified.

- G10. If, for any reason, the Permittee does not comply with or will not be able to comply with, any daily maximum effluent limitations specified in this Permit, the Permittee shall:
- a. Immediately take action to stop, contain, and clean up the unauthorized discharge and correct the problem.
 - b. Provide the Council with the following information, in writing, within 48 hours of becoming aware of such condition:
 - (1) A description of the discharge and cause of non-compliance; and
 - (2) The period of noncompliance, including dates and times; or if not corrected, the anticipated time the noncompliance is expected to continue and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the conditions of this Permit or the resulting liability for failure to comply.

- G11. The Permittee shall at all times maintain in good working order and efficiently operate all treatment or control facilities or systems installed or used by the Permittee to achieve compliance with the terms and conditions of this Permit.
- G12. The diversion from or bypass of any discharge from facilities utilized by the Permittee to maintain compliance with the terms and conditions of this Permit is prohibited, except (a) where unavoidable to prevent loss of life or severe property damage, or (b) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the terms and conditions of this Permit. The Permittee shall promptly notify the Council in writing of each such diversion or bypass in accordance with the procedure specified in Condition G10.
- G13. Permittee shall install an alternative electric power source capable of operating any electrically powered pollution control facilities; or, alternatively, Permittee shall certify

to the Council that the terms and conditions of this Permit will be met in case of a loss of primary power to the pollution control equipment by controlling production.

- G14. Prior to construction, Permittee shall advise the Council of the design redundancy in the settling capacity of the storm runoff settling ponds with regard to the maximum 24-hour, 10-year rainfall expectancy (3.5 inches). The Council reserves the right to require increased pond capacity or to require such other action as it deems necessary.
- G15. No dumping, spilling or deposit of oil, grease, chemicals, cement truck washings or other substances in areas within which such substances may be drained, washed or carried into discharges from the Plant Site will be allowed, except as specifically authorized in this Permit. Permittee must present to the Council plans outlining preventive, surveillance and corrective measures designed to provide an effective barrier to introduction of foreign substances to Construction Runoff Discharge. No discharges may be made from Discharge Points 002, 003, 004, or 005 unless and until such plans have been accepted and approved by the Council.
- G16. The Permittee shall prepare and present to the Council prior to the discharge of any effluent, an operational manual describing the proper operation of the settling ponds at Discharge Point Serial Nos. 002, 003, 004 and 005, including but not limited to methods of discharge operation, monitoring release and pumping of residue. No discharge shall be made until the operational manuals have been reviewed and accepted by the Council. The Council reserves the right to require amendments to the operational manual at any time.
- G17. No discharges from settling ponds at Discharge Outfall Point Serial Nos. 002, 003, 004, or 005 shall be made if the temperature of the discharge exceeds 70° Fahrenheit; provided that the Council may temporarily waive this limitation if the Council determines that such waiver is appropriate and prudent, considering the total effect upon the ecosystem.
- G18. In the event that operation of Discharge Outfall Points 002, 003, 004 or 005 are shown to have caused damage to downstream property owners through siltation of Tank or Wiseman Creeks, Permittee shall negotiate in good faith with any affected property owner or owners to effect a resolution acceptable to all parties thereto.
- G19. When plant operation commences, the Permittee shall make and report to the Council an analysis to determine the levels of entrained radioactive material being released into the Skagit River.

- G20. Following installation of Ranney wells, and prior to Plant operations, at the earliest time when well intake water composition can be expected to be equivalent to intake during plant operations, Permittee shall conduct base line water quality studies equivalent to those heretofore conducted on Skagit River water. Results of such study or studies shall be made available immediately to the Council. If intake water differs in quality or composition from Skagit River water as described in conjunction with the Application, effects of such difference upon discharge shall be described. If such a difference appears, the Council may require that a new application be filed, require that water treatment or other regulatory steps be taken, or take such other steps as it may deem necessary to insure that discharge quality will be maintained within the parameters established within this Permit.
- G21. The Permittee shall prepare and present to the Council prior to the discharge of any effluent at Discharge Point 001, first, the results of its investigation concerning pipelines laid in the bed of the Skagit River near the proposed diffuser site and which may have been damaged or destroyed by the action of the river or objects carried therein, and second, a review of Applicant's diffuser design in light of the results of the aforementioned investigation in such detail as will permit the Council to evaluate the diffuser design in view of potential river hazards, and third, a summary of any engineering or design changes in such detail as may enable the Council to review their effectiveness. No discharge shall be made at Discharge Point Serial No. 001 until the above information has been received and approved by the Council. The Council reserves the right to require amendments to the design plan before, during or after any discharge period.
- G22. The Permittee shall prepare and present to the Council, prior to the discharge of any effluent at Discharge Point Serial No. 001, information showing the establishment and maintenance of a monitoring system which will enable it to determine whether the diffuser is in place and operating properly. No discharge shall be made until the information concerning the plan has been reviewed and accepted by the Council. The Council reserves the right to require amendments to the monitoring system before, during or after any discharge. If the diffuser is lost or damaged for whatever reason or cause in any manner adversely affecting the mixing of the effluent the Permittee shall immediately notify the Council and discharge, except from the fish rearing facility,

shall cease at the earliest physically and technically possible moment, and shall not again begin until the Permittee has satisfied the Council that the diffuser has been replaced or repaired in such manner as will insure efficient mixing of the effluent; provided that the Council may temporarily waive the requirement that the discharge cease if the Council determines that protection of the overall public interest and welfare will be served and damage to the environment will be minimal.

- G23. Upon full operation, and yearly thereafter the Permittee shall conduct tests indicating effects of discharge upon the most sensitive significant aquatic species. The specific tests to be conducted shall be proposed by the Applicant subject to approval of the Council. If these tests indicate that damage to the aquatic biota is a potential effect of discharge operation, the Council may require such modifications of discharge operations as will in the Council's judgment, effectively protect the ecosystem, and may suspend or cancel portions of this Permit until discharges are shown to be in full compliance with all terms and conditions herein.
- G24. Prior to the conduct of hydrostatic testing and flushing operations, Permittee shall prepare and present to the Council written procedures to be followed in the handling thereof. These procedures shall be subject to Council acceptance, modification, or rejection. No such operations shall be conducted except pursuant to procedures approved by the Council.
- G25. No supplemental biocide, other than sodium hypochlorite solution as described in the Application, will ever be used or discharged in connection with or from Discharge Point Serial No. 001.
- G26. During any period of discharge at outfall point 001, the Council may in its discretion require Permittee to conduct surveys to assess the nature and extent of attraction, if any, which the discharge plume may pose to aquatic organisms. Such surveys shall be conducted by state-of-the-art methods; precise method and timing of the surveys shall be proposed by the Permittee subject to Council approval. If the results of such surveys demonstrate that a significant hazard is posed to the aquatic biota, the Council may take such action as it deems necessary, including but not limited to requiring suspension of discharge until harmful conditions are eliminated.

Monitoring

- G27. Permittee shall comply with the Monitoring Program requirements set forth herein:

Monitoring results for the previous quarter shall be summarized on a monthly basis and reported on a Discharge Monitoring Report Form (EPA 3320-1), postmarked no later than the 28th day of the month following the end of the quarter. The first report is due the 28th day of the first month following the end of the quarter in which the first discharge under this Permit occurs. Duplicate signed copies of these, and all other reports required herein shall be submitted to EPA and the Council at the following addresses:

U.S. EPA Region X
1200 Sixth Avenue
Seattle, WA 98101
Attention:
Permits Branch M/S 521

TPPSEC
Attention:
Executive Secretary
820 East 5th Avenue
Olympia, WA 98504

- G28. The Permittee shall retain for a minimum of five years all records of monitoring activities and results, including all reports of recordings from continuous monitoring instrumentations, record of analysis performed and calibration and maintenance of instrumentation. This period of retention shall be extended during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by the Council.
- G29. All samples and measurements made under this program shall be representative of the volume and nature of the monitored discharge.
- G30. The Permittee shall record each measurement or sample taken pursuant to the requirements of this Permit for the following information: (1) the date, place and time of sampling; (2) the dates the analyses were performed; (3) who performed the analyses; (4) the analytical techniques or methods used; and (5) the results of the analyses.

Other Provisions

- G31. As used in this permit, the following terms are as defined herein:

- a. The "daily maximum" discharge means the total discharge by weight during any calendar day.
- b. The "daily average" discharge means the total discharge by weight during a calendar month divided by the number of days in the month that the respective discharges occur. Where less than daily sampling is required by the Permit, the daily average discharge shall be determined by the summation of the measured daily discharges by weight divided by the number of days during the calendar month when the measurements were made.
- c. "Composite sample" is a sample consisting of a minimum of six grab samples collected at regular intervals over a normal operating day and combined proportional to flow, or a sample continuously collected proportional to flow over a normal operating day.
- d. "Grab sample" is an individual sample collected in a period of less than 15 minutes.

G32. All sampling and analytical methods used to meet the monitoring requirements specified in this Permit shall conform to regulations published pursuant to Section 304(g) of the Federal Act, or if there is no applicable procedure, shall conform to the latest edition of the following references:

- a. American Public Health Association, Standard Methods for the Examination of Water and Wastewaters.
- b. American Society for Testing and Materials, A.S.T.M. Standards, part 23, Water, Atmospheric Analysis.
- c. Environmental Protection Agency, Water Quality Office Analytical Control Laboratory, Methods for Chemicals Analysis of Water and Wastes.

Alternative methods may be utilized if approval pursuant to 40 CFR 136 or as amended is received by Permittee. The Council shall be notified of each such alternative method approved for use.

G33. Except for data determined confidential under Section 308 of the Federal Act, all reports prepared in accordance with the terms of this Permit shall be available for public inspection

at the offices of the Council and the Regional Administrator. As required by the Federal Act, effluent data shall not be considered confidential. Knowingly making a false statement on any such report may result in the imposition of criminal penalties as provided in Section 309 of the Federal Act.

G34. After notice and opportunity for a hearing this Permit may be modified, suspended or revoked in whole or in part during its term for cause, including but not limited to the following:

- a. Violation of any terms or conditions of this Permit;
- b. Obtaining this Permit by misrepresentation or failure to disclose fully all relevant facts;
- c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge; and
- d. If any provision of this permit is declared invalid by the courts.

G35. The Permittee shall, at all reasonable times, allow authorized representatives of the Council upon the presentation of credentials:

- a. To enter upon the Permittee's premises for the purpose of inspecting and investigating conditions relating to the pollution of, or possible pollution of any of the waters of the State, or for the purpose of investigating compliance with any of the terms of this Permit;
- b. To have access to and copy any records required to be kept under the terms and conditions of this Permit;
- c. To inspect any monitoring equipment or monitoring method required by this Permit; or
- d. To sample any discharge of pollutants.

G36. Nothing in this Permit shall be construed as excusing the Permittee from compliance with any applicable Federal, State or local statutes, ordinances or regulations.

- G37. Nothing in this Permit shall be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities or penalties to which the Permittee is or may be subject.
- G38. Should any provision of this Permit be declared by the courts to be unconstitutional or invalid, by reason of federal preemption or otherwise, such decision shall not affect the validity of the other provisions of this Permit, which shall remain in full force and effect.

ATTACHMENT II

PUGET SOUND POWER & LIGHT COMPANY SKAGIT NUCLEAR POWER PROJECT SITE CERTIFICATION AGREEMENT

ENVIRONMENTAL MONITORING PROGRAM

INDEX

- I. Introduction
- II. Reports
- III. Monitoring Program Description
 - A. Baseline
 - B. Construction
 - C. Pre-Operational/Operational
 - 1. Water Quality/Hydrology
 - 2. Meteorology
 - 3. Radiation Monitoring
 - 4. Terrestrial Biotic Monitoring
 - 5. Aquatic Biotic Monitoring

I. INTRODUCTION

This attachment to the Site Certification Agreement provides a synopsis of the environmental monitoring program for the Skagit Nuclear Power Project. The program is divided into three separate but closely intertied phases:

- A. Baseline monitoring
- B. Construction monitoring
- C. Pre-operational/Operational monitoring

Emphasis is placed on the Pre-operational/Operational stage. Reporting schedules and program change techniques are also described. Monitoring required under terms of the NPDES Permit are in addition to those specified herein.

II. REPORTS

Periodic program status and results reports will be submitted to the Council. Reports will be submitted on or before the last day of March, June, September and December during periods of site preparation and construction, and on the last day of March and September of each year thereafter.

Specific data to be reported and schedule for reporting socioeconomic effects of construction as described and required in Certification Agreement Section VI.C. shall be determined, following discussions among Puget, Skagit County and the Council, no later than one year from the effective date of the Certification Agreement.

III. MONITORING PROGRAM DESCRIPTION

A. Baseline

The baseline environmental monitoring program, that has been and is being utilized, is described in the following sections of Application 74-1:

115(3)	Background Radiation Levels
125(8)	Baseline Water Quality
130(2)	Air Quality & Meteorological Conditions
135(1)	Terrestrial Biota Description
135(2)	Aquatic Biota Description
145(1)	Archeological Sites
150(3)	Radiation Monitoring
150(4)	Water Quality Monitoring
150(5)	Air Quality Monitoring
150(6)	Biota Quality Monitoring

Its purpose has been to provide a base upon which to assess the effects of Project construction and operation. Thus, Project-induced variations or changes can be determined and corrective action taken if necessary. The program will continue with sampling locations and frequencies being adjusted appropriately as determined by the adequacy of the data and the "normalcy" of the environment. The program is designed to provide an orderly transition to the construction monitoring phase.

B. Construction

The construction environmental monitoring program will essentially be a continuation of the studies conducted during the baseline phase. However, the level of activity will be increased in those areas where impact due to construction is likely to occur. Archeological, aquatic, terrestrial, water quality, and air quality monitoring will be carried out during construction as indicated in Application 74-1 sections

120(1)	Excavation & Erosion
145(1)	Archeological Sites
150(4)	Water Quality Monitoring
150(5)	Air Quality Monitoring
150(6)	Biota Quality Monitoring
150(7)	Construction Archeology

The addition of temporary stations and adjustment of sampling frequencies will be such as to ensure timely assessment of Project induced variations with the implementation of corrective measures if necessary. Sampling will be reduced as construction activities that significantly affect the environment are decreased or terminated, however, sampling will not be discontinued until it can be shown that a station is no longer affected by construction activities.

C. Pre-Operational/Operational

The pre-operational/operational phase of the program will, in many respects, be similar to that conducted during preceding phases. However, the studies will concentrate on the areas where an impact may be possible due to the operation of the Project. Initiation will take place approximately one year prior to initial fuel loading for Unit 1 and in some instances as early as two years. The areas to be covered are:

1. Water Quality/Hydrology
2. Meteorology
3. Radiation Monitoring
4. Terrestrial Biotic Monitoring
5. Aquatic Biotic Monitoring

The monitoring program shall be governed by the following gradient concept to avoid nondiscovery of excessive variance in values of the parameters monitored. The frequency of data collection and reporting shall be increased when:

- a. Limits exist for monitored parameter, and the last value approaches a limiting value by more than 50% of the difference between the limiting value and the preceding value; or
- b. No limits exist for monitored parameter and the difference between the last value and the preceding value exceeds 150% of the difference between the preceding value and the next preceding value when both differences are in the same direction or 200% if in a contrary direction.

The scope of the Environmental Monitoring Program will be modified as the need arises. Such modifications will be based upon evaluations or determinations pertaining to existing studies, program features, or resulting data. Program changes, together with the justification rationale will be submitted to the Council as part of the applicant's periodic reports. Proposed deletions of sampling stations, sample parameters, etc. will be submitted to the Council for approval. If the Council does not approve any such submittal, it agrees to respond with any comments within forty-five (45) days of receipt of the submittal.

Initial operation, as used in this attachment, is defined as the date of initial commercial operation for a unit.

A discussion of each program subsection follows.

1.0 WATER QUALITY/HYDROLOGY

The pre-operational program will begin at the start of the hydrologic year preceding Unit 1 initial fuel loading. Locations to be sampled are shown on Figure C-1.1 and the frequencies of analysis of each parameter are listed in Table C-1.1. Subject to the consent of the owners of such wells and to the feasibility of obtaining such measurements in such wells, water quality, water level, and water yield in the five domestic wells closest to the Ranney Collectors will be monitored quarterly beginning one calendar year prior to collector operation.

The program will be continued for one hydrologic year following Unit 1 initial operation. After this year, the frequency of sample collection at locations, other than those at and below the diffuser (SL 4 and 6), will be reduced (biweekly sampling to monthly; monthly sampling to quarterly, etc.) until at least one hydrologic year preceding Unit 2 initial fuel loading. The full program will then be reinstated and continued for one hydrologic year after Unit 2 initial operation. Based on data generated during these years monitoring at locations other than the Project discharge may be discontinued.

Sampling stations in the Project discharge pipeline (SL 4a) and in the major axis of the discharge plume (SL 4) will be established as part of the operational sampling program. Effluents in the discharge streams making up the Project discharge and the combined discharge will be sampled frequently during the first few months of operation until a satisfactory balance of

chemical additions is established. The sampling frequency for the combined discharge then will be reduced to that shown on Table C-1.1 for a period of a year. Each sample taken for analysis will consist of a 24-hour composite to ensure a representative sample. It is expected that during the first year of operation sufficient data will be gathered to characterize the effluent so that the sampling frequency may be reduced thereafter. Analysis will be for parameters:

- a. the pre-operational program has shown to exist in the intake water,
- b. expected to be part of the discharge, and
- c. required by applicable local, state, and federal regulations.

Parameters may be added or deleted from this list (Table C-1.1) based on results from the studies or modifications in local, state, or federal regulations.

A detailed study to define the extent and nature of the effluent plume will be performed seasonally during the first year of operation for both Unit 1 and Units 1 and 2 simultaneously. The sampling scheme will be a three-dimensional grid blanketing the region of the plume, with control locations sampled directly upstream from the Project discharge.

The temperature, pH, dissolved oxygen, alkalinity and like parameters and flow rate of the Project discharge will be monitored continuously before it enters the Skagit River. Monitoring of chlorine in the Project discharge shall be as

specified in the NPDES Permit for the Project, as said Permit may be modified or reissued from time to time. The exact location of sample point 4a has not been established. However, it will be in the pipeline at a location downstream of the junction of all streams that make up the Project discharge.

TABLE C.1-1

AQUATIC MONITORING FREQUENCY BY SAMPLING LOCATION AND PARAMETER (1)

Parameter	Domestic Wells (5)	Ranney Collector (SL 1a)	Pipeline In River (SL 4)	Pipeline In Pipe (SL 4a)	Shake Mill (SL 6)	Lower Tank Cr. (SL 9a)	Lower Wiseman Cr. (SL 10)	Sorenson Cr. (SL 12)
Physical and Chemical								
Flow	-	C	-	C	-	BW	BW	-
Temperature	Q	BW	BW	C	BW	BW	BW	-
Total Hardness (EDTA)	Q	BW	BW	BW	BW	M	M	-
Alkalinity Total (Methyl orange)	Q	BW	BW	BW	BW	M	M	-
Turbidity	-	BW	BW	D	BW	BW	BW	-
pH	Q	BW	BW	C	BW	BW	BW	-
Dissolved Oxygen	-	BW	BW	D	BW	M	M	-
Color	-	M	M	-	M	M	M	-
Conductivity	Q	BW	BW	D	BW	BW	BW	-
Suspended Solids	-	BW	BW	D	BW	BW	BW	-
Total Dissolved Solids	Q	M	M	M	M	Q	Q	-
Biochemical Oxygen Demand	-	Q	Q	W	Q	Q	Q	-

(1) C=continuous; D=daily; W=weekly; BW=every 2 weeks; M=monthly; Q=quarterly;
 (-) not done; X=done as per text; 5/yr=done in Jan., Apr., Jun., Aug. Oct;
 2/yr=done in Apr. and Aug.

TABLE C.1-1

Sheet 2 of 3

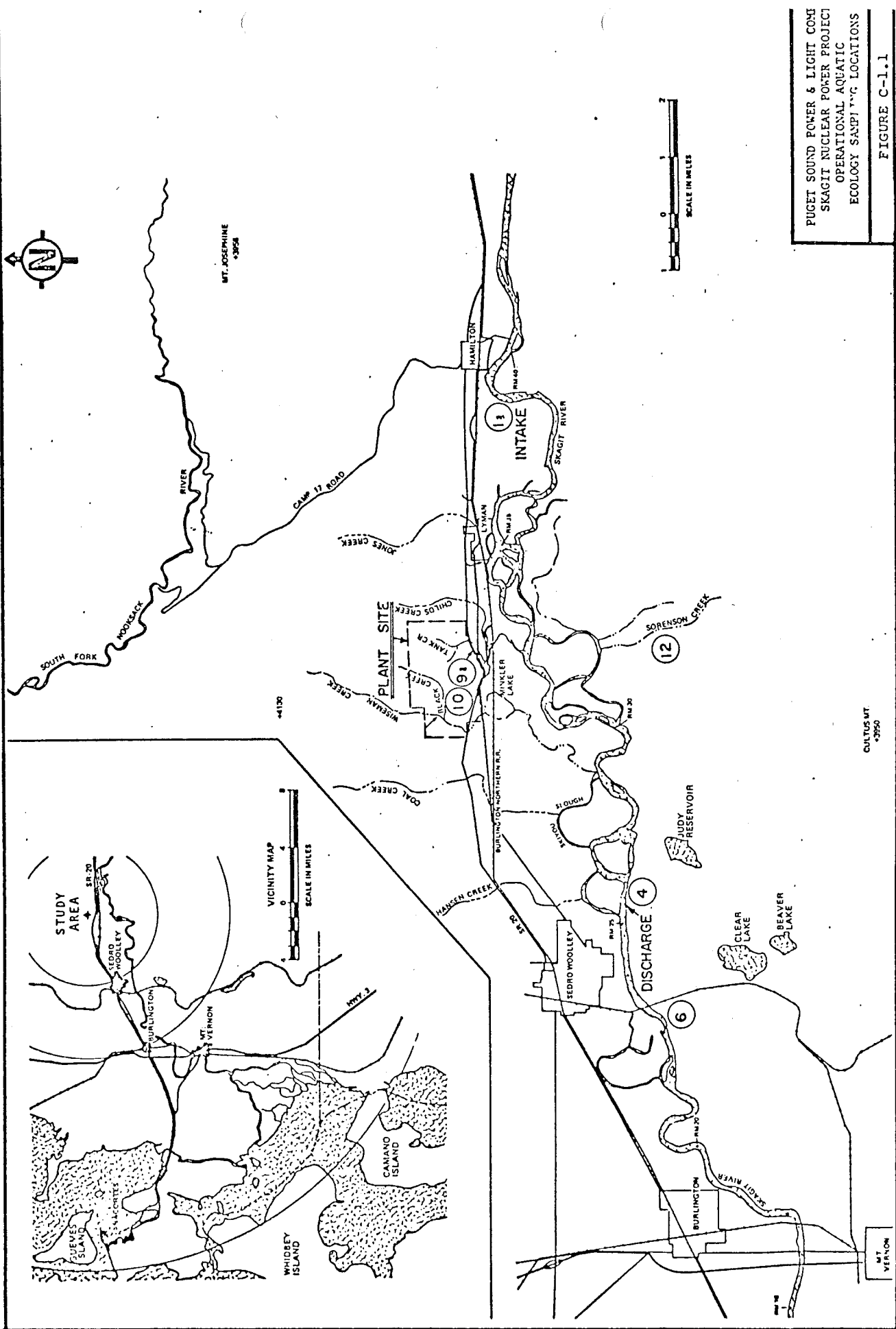
Parameter	Domestic Wells (5)	Ranney Collector (SL 1a)	Pipeline In River (SL 4)	Pipeline In Pipe (SL 4a)	Shake Mill (SL 6)	Lower Tank Cr. (SL 9a)	Lower Wiseman Cr. (SL 10)	Sorenson Cr. (SL 12)
Chemical Oxygen Demand								
Nitrate		W	M	W	M	M	M	
Phosphate (total P)		M	M	M	M	M	M	
Sulfate	Q	W	M	W	M	Q	Q	
Sulfites		Q	Q	Q	Q			
Borates		Q	Q	Q	Q			
Chlorine		Q	BW	(2)	BW			
Chloride	Q	M	BW					
Chlorine Demand (5 min)		BW	M	BW	M	Q	Q	
Chlorine Demand (30 min)		M	M	M	M			
Phenol		Q	Q	Q	Q			
Ammonia		W	M	W	M	M	M	
Total Coliform	Q	W	M	W	M	M	M	
Sodium	Q	M	M	M	M	Q	Q	
Silica	Q	M	M	M	M	Q	Q	
Calcium	Q	M	M	M	M	Q	Q	
Magnesium		M	M	M	M	Q	Q	
Iron, Total	Q	M	M	M	M			
Manganese	Q	Q	Q	Q	Q			
Copper		W	M	M	M			

(2) Monitoring of chlorine in the Project discharge shall be as specified in the NPDES Permit for the Project, as said Permit may be modified or reissued from time to time.

TABLE C.1-1

Sheet 3 of 3

Parameter	Domestic Wells (5)	Ranney Collector (SL 1a)	Pipeline In River (SL 4)	Pipeline In Pipe (SL 4a)	Shake Mill (SL 6)	Lower Tank Cr. (SL 9a)	Lower Wiseman Cr. (SL 10)	Sorenson Cr. (SL 12)
Chromium, Total								
Zinc								
Lead								
Biological								
Invertebrates and algae	-	5/yr	5/yr	-	5/yr	5/yr	5/yr	-
Fish	-	5/yr	5/yr	-	5/yr	5/yr	5/yr	2/yr
Stream Surveys	-	-	-	-	-	X	X	X



PUGET SOUND POWER & LIGHT COMB
SKAGIT NUCLEAR POWER PROJECT
OPERATIONAL AQUATIC
ECOLOGY SAMPLE LOCATIONS

FIGURE C-1.1

2.0 METEOROLOGY

The on-site meteorological program began in May 1973. Wind speed and direction, temperature, and dewpoint are measured by sensors installed on a 60 meter tower. Precipitation is measured on the roof of the associated instrument building. On-site meteorological instrumentation is listed in Table C-2.1.

During the operational period, wind speed, wind direction, and temperature will be displayed in the control room.

Operation of the satellite meteorological station, installed in Burlington in January 1974 to supplement the on-site program, will be continued during the Project operational period.

Time lapse photographs from a location sufficient to allow view of total visible plume will be taken at least hourly during periods when no visible plume is present, and at ten-minute intervals when any visible plume is present.

TABLE C-2.1

METEOROLOGICAL INSTRUMENTATION

<u>Parameter</u>	<u>Level (m)</u>	<u>Instrument</u>	<u>System Accuracy</u>	<u>Calibrated Range</u>
Wind Speed (analog)	10,60	Cup Anemometer	<u>+1</u> mph	0.6-90 mph
Wind Speed (digital)	10,60	Cup Anemometer	<u>+1%</u> or <u>.15</u> mph	0.6-90 mph
Wind Direction	10,60	Vane Anemometer	<u>+</u> 55°	0-539
Temperature	10	Thermistor	<u>+0.1</u> °C	-30 to 50°C
Temperature Differential	10-35 10-60	Termistor	<u>+0.1</u> °C	-5 to + 10°C
Dewpoint	10,60	Dewcell	<u>+1.0</u> °C	-30 to 50°C
Wind Direction Variability	10	Sigma Computer	<u>+3</u> °	0-40°
Precipitation	3	Rain Gauge Tipping Bucket	<u>+0.01</u> <u>in.</u>	0-1"

3.0 RADIATION MONITORING

The pre-operational radiation monitoring program will be implemented two years prior to Unit 1 fuel loading. The program may be modified prior to or during operation of the Project upon review and approval of the Council.

3.1 Program Elements

3.1.1 Airborne radioactivity

Airborne particulates and I-131 will be sampled continuously at three locations near the plant site perimeter calculated to receive maximum ground-level concentrations, at the nearest residence, and at the communities of Lyman, Hamilton, Sedro Woolley and Burlington. Also, one control sample will be obtained at a location to be selected at a distance of 20 miles or more in the sectors indicated as being the least prevalent wind directions.

Direct radiation due to gaseous and particulate releases will be monitored using continuous recording pressurized ion chambers at three locations near the plant site perimeter calculated to receive maximum ground-level dose. In addition^a, thermoluminescent dosimeters (TLD) will be placed at each of the nine air sampling locations. Two sets of three dosimeters will be placed at each location. One set will be changed monthly and the other set will be changed quarterly.

3.1.2 Waterborne radioactivity

Surface water samples from the Skagit River will be collected at the plant discharge area, upstream from the discharge area at the

Ranney Collector site, and downstream at a distance to permit thorough mixing and dilution. Sampling frequency will be monthly, providing a time-related record of nuclide concentrations.

In addition, surface waters will be collected monthly from Minkler Lake, Wiseman Creek, and the reservoirs providing drinking water to the communities of Lyman, Sedro Woolley, Burlington, and Mt. Vernon. Ground water will be sampled quarterly from several wells used for domestic supply, including use for livestock. Arrangements will be made to obtain weekly composite samples representative of the Anacortes raw water supply.

3.1.3 Aquatic biota and sediments

Samples of bottom sediments, benthos, and aquatic plants will be obtained semiannually at the three Skagit River water sampling locations and from Minkler Lake.

Oysters will be collected annually from one location in Puget Sound.

Fish will be collected semiannually from the Skagit River both above and below the discharge area, and from Minkler Lake. Emphasis will be placed on resident species of fish.

3.1.4 The terrestrial environment

Milk will be collected monthly from four dairy farms in the vicinity of the Project.

Fruits and vegetables grown in the Skagit Valley within ten miles of the plant site will be sampled annually at time of harvest at or near the point of maximum predicated ground-level concentration

of vent releases. Each important crop will be sampled as available. Control samples of each variety will be obtained, if available, from at least 20 miles north-northwest of the plant site as the least prevalent wind direction. Green, leafy vegetables or, alternatively, weeds with similar leaf characteristics, will be sampled monthly in the immediate plant site area.

Meat and poultry or, alternatively, feedstuffs and forage will be sampled semiannually in the two prevailing wind directions and/or from downstream herds using the river for drinking water. One or more samples of venison will be obtained in season as available through local sportsmen.

Surface soil will be collected semiannually at each of the nine air sampling locations.

3.2 Program description

The radiation monitoring program is presented in Table C-3.1. The program therein defined will be in effect at least two years prior to Unit 1 fuel loading and during the first year of operation of Unit 1. Beyond the first year of Unit 1 operation, the program may be modified after approval by the Council to accommodate Unit 2, providing a level of surveillance consistent with the documented operational release rates and measured environmental concentrations.

Radiochemical analyses will be performed using procedures at least equal to, or better than, those contained in the following documents: (1) U. S. Environmental Protection Agency, "Handbook of Radiochemical Analytical Methods," Document EPA-680/4-75-001, February 1975. (2) "Health and Safety Laboratory Procedures Manual,"

U.S. Energy Research and Development Administration, HASL-300, 1972.
(3) "Standard Methods for the Examination of Water," American Public Health Association, 13th Edition.

The analytical laboratory will be required to participate in recognized analytical quality control programs. Internal quality control analysis including "spikes" (samples to which known activity is added), "splits" (homogenous sample analyzed as two samples), and "blanks" (samples free of man-made activity) will account for a nominal ten percent of all analytical work. Blind duplicates (field replicates) and/or spikes may be submitted periodically along with regular samples. Arrangements will be made for exchange or sharing of samples with the State of Washington to provide cross check data.

PRE-OPERATIONAL/OPERATIONAL RADIOLOGICAL MONITORING PROGRAM

<u>Parameter of Sample Type</u>	<u>Approximate Number and Location</u>	<u>Collection Frequency</u>	<u>Analysis and Frequency</u>
Airborne particulates	3--Plant Site perimeter 1--Nearest residence 1--Lyman 1--Hamilton 1--Sedro Woolley 1--Burlington 1--Control	Weekly	Gross beta weekly, Gross alpha monthly, Gamma isotopic monthly composites SR89 and SR90 quarterly composites
Airborne iodine	Same as airborne particulates	Weekly	I ¹³¹ weekly
Gamma Sensitive Recorders	3--Plant Site perimeter	Continuous	Gamma exposure
TLD Dosimeters	9--Same as airborne particulates and iodine	Monthly and Quarterly	Gamma dose monthly, quarterly
*Surface water	1--Skagit River, near Ranney Collector (SL 1a) 1--Skagit River, Discharge area (SL 4) 1--Skagit River, Shake Mill (SL 6) 1--Minkler Lake (SL 11) 1--Wiseman Creek (SL 10)	Monthly	Gamma isotopic and tritium monthly, SR89, SR90 quarterly composites

*See Figure C-1.1

TABLE C-3.1 (continued)

Parameter of Sample Type	Approximate Number and Location	Collection Frequency	Analysis and Frequency
Ground water	3--Domestic wells 1--Hamilton	Quarterly	Gamma isotopic quarterly Tritium quarterly
Drinking water	1--Anacortes 1--Jones Creek 1--Judy Reservoir	Weekly Monthly	Gross beta on collection Gamma isotopic and tritium monthly, Sr89 and Sr90 quarterly composite
Aquatic biota and sediments	4--Same as surface water as available	Semiannually	Gamma isotopic and Sr89 and Sr90 semiannually
Oysters	1--Puget Sound	Annually	Gamma isotopic
Fish	4--Same as surface water	Semiannually	Gamma isotopic on flesh Sr89 and Sr90 on bones, all semiannually
Milk	1--Nearest dairy 3--Other dairies	Monthly	I131, gamma isotopic and Sr89 and Sr90 monthly
Fruits and vegetables	1--Each major crop within 5 miles 1--Control for each crop 1--Leafy vegetables, Plant Site perimeter	At harvest Monthly (when available)	Gamma isotopic I131 monthly
Meat, poultry and game	2--Within 5 miles	Semiannually (when available)	Gamma isotopic
Soil	9--Same as airborne particulates	Semiannually	Gamma isotopic and Sr89 and Sr90

4.0 TERRESTRIAL BIOTIC MONITORING

4.1 Vegetation Studies

Vegetation studies will be designed to monitor (a) rate of succession of vegetation, (b) changes in plant species distribution, and (c) growth rate, productivity, and nutrient ion use by the forest and wildlife biological indicator species. These monitoring programs will provide data from which to determine changes in these parameters, if any, due to natural phenomena, other non-Project land use, or effects of Project operation. Tentative observation and data collecting points for these studies are shown in Figure C-4.1. Additional study plots will be established as necessary to provide suitable controls and as additional areas of possible impact are identified. Table C-4.1 summarizes the monitoring program and techniques.

False-color infrared aerial photography at scales of 1:6000 and 1:12000 will be flown in late spring or early summer before and after initial operation of each unit, and thereafter biennially for three periods. The same grid will be photographed each flight. This will provide a basis for early discovery of changes in existing plant communities that might not otherwise be apparent from ground investigation as well as a means of mapping these changes. Aerial photography will facilitate location of areas which require more detailed field study.

A portion of the operational monitoring program will be used to quantify the vegetative successional process within the Plant Site environs, and to correlate changes in community structure, composition, and diversity with natural and artificial changes in the environment. In addition, these data will be correlated with

spectral characteristics of infrared aerial photographs. Sampling will be conducted in the spring and summer two years before initial operation of unit one and again in the spring and summer after the first full year of operation for each unit. Sampling will be conducted periodically after both units are operational. Sampling will include both vascular (trees, shrubs, herbs) and nonvascular (mosses and lichens) plant species.

Tree, shrub, and herb productivity around the Plant Site will be monitored before and after initial fuel loading of each unit, using quadrat harvest, litter fall, diameter and height growth measurements techniques. Annual variations will be correlated with seasonal variations in the controlling factors, such as, solar energy, temperature, rainfall, and nutrients. This will determine if any changes in annual productivity are caused by natural events, outside land uses, or Project operation-related factors. The program will be repeated periodically after both units are operational.

The natural deposition of salts from rainwater will be determined before initial operation of the cooling towers from rainwater samples collected on the Plant Site and from locations to the east and west of the Plant Site. Data obtained from these analyses will serve as a baseline against which to measure any impact of cooling tower drift deposition.

Soils and foliage of selected plant species will be analyzed before initial cooling tower operation for the occurrence and amount of nutrient salts to determine the nutrient status of plants and soils. Chemical constituents expected to occur in cooling tower drift will be

emphasized in this analysis. Soil salinity will be determined before and after initial cooling tower operation. Samples will be taken from those areas where cooling tower salt deposition is projected to be significant as well as from control areas, including nearby agricultural areas.

4.2 Faunal Studies

Surveillance programs for monitoring Project operation impacts on terrestrial fauna will be conducted for one year prior to the initial fuel loading of Unit 1 and during the first full year after the operation of Unit 2. The program will be reviewed at the end of the second sampling year and a decision for continuing studies will be made at that time. If during the monitoring period changes within the terrestrial fauna populations become apparent, additional studies to determine the causes and, if required, to formulate appropriate mitigative measures will be considered.

The sampling program will include the biological impact indicators; black-tailed deer, deer mouse, ruffed grouse, bald eagle, and songbird populations (Table C-4.1). These species were and will be studied during the baseline, preconstruction, and construction monitoring periods. Available data will be used to discriminate between natural, non-Project, and Project-induced population variations.

Winter populations of black-tailed deer will be monitored by the pellet group count method at previously established sample points. Deer mice populations will be monitored on two study plots. Drumming counts for monitoring ruffed grouse population changes will be conducted at selected sample points established during the previous

studies (Figure C-4.1).

Populations of wintering bald eagles along the Skagit River from Hamilton to Sedro Woolley will be surveyed by boat in December, February, and March, one year prior to initial fuel loading of Unit 1 and continuing for one year after initial operation of Unit 2. Reproductive success of bald eagles at the Day Creek nest (approximately 1.5 miles southeast of the Plant Site) will be checked during the early summer months.

Transect counts to monitor the population levels and diversity of wintering and breeding nongame birds will be conducted in January and June.

Close cooperation will be maintained with governmental agencies regulating or studying fauna in the Skagit Valley and all available information exchanged with such agencies upon request. Any information received by Puget in this manner will be reported to the Council on the same schedule as reports of Puget's own data.

Estimations of bird mortality due to collisions with Project structures, i.e., cooling towers, reactor and turbine buildings, will be obtained during fall and spring migration seasons. Records of all discovered deaths from this cause shall be kept and maintained.

TERRESTRIAL ECOLOGY MONITORING PROGRAM FOR UNITS 1 AND 2

Event	Schedule	Methods	Analysis
Aerial Photography	Early spring or late summer before and after the initial fuel loading of each unit and thereafter biennially for 3 periods	False-color infra- red photography	Changes in vegetation patterns, vegetation health
Plant community analysis	Spring and summer two years before Unit 1 initial fuel loading and spring and summer after first full year of operation of each unit	Established quadrat sampling techniques	Species distribution, abundance, density, frequency dominance, importance, diversity
Primary production	Before and after the initial fuel loading of each unit	Quadrat harvest techniques, extension growth, litterfall, diameter and height growth	Net primary production with emphasis on wild- life forage and food species
Soil and foliar salts	Soil and foliar nutrients one year before Unit 1 initial fuel loading. Soil salinity before and after initial fuel loading of each unit. Foliage again one full year after initial oper- ation of each unit.	Chemical analytical techniques for nutrient ions; soil conductivity	Nutrient ion presence and quantity in soil and foliage; soil salinity

TABLE C-4.1

Sheet 2 of 3

Event	Schedule	Methods	Analysis
Rainwater salt deposition	Before and after initial cooling tower operation	Rain water collection and chemical analysis	Natural salt species content
Black-tailed deer	April, December (a)	Pellet group counts	Changes in winter populations and habitat usage
Deer mice	Fall (a)	Live-trapping	Fall population changes
Ruffed grouse	Spring (a)	Drumming counts	Change in spring populations and habitat usage

(a) All surveys will occur during the year before the initial operation of Unit 1 and the first full year following the initial operation of Unit 2.

TABLE C-4.1

Sheet 3 of 3

Event	Schedule	Methods	Analysis
Bald eagle	December, February, March, early summer (b)	Skagit River surveys by boat, observation of Day Creek nest	Winter population numbers, reproductive success
Nongame birds	January, June (a)	Transect counts	Changes in population numbers and diversit of wintering and breeding birds
Bird mortality	May, September (a)	Searches for dead birds around base of plant structures	Numbers of dead birds during migration periods

(b) All surveys for the bald eagle will occur one year prior to the initial fuel loading of Unit 1 and continue for one year after initial operation of Unit 2.

5.0 AQUATIC BIOTIC MONITORING

The preoperational and operational programs for monitoring the influence of Project operation on aquatic ecosystems in the lower Skagit Basin will retain many features of the baseline monitoring program. The baseline ecological conditions in these waters established during the baseline and preoperational programs can be compared with postoperation measurements to monitor Project-induced variations.

Additional studies will begin prior to initial Unit 1 fuel loading. These studies will be designed to evaluate effects of operation on aquatic biota in receiving waters within the measurable discharge plume. The effects of the Ranney Collectors on aquatic biota will also be evaluated.

An extensive aquatic biota monitoring program will commence one year before initial operation of Unit 1 to verify baseline conditions determined in the 1973-1975 program. Locations to be sampled and frequency of sampling are given in Table C-5.1. This monitoring program will continue through two years of Unit 1 operation to assess the effects, if any, on aquatic ecosystems in the vicinity of the Plant Site. The third year of this continuing operational monitoring program will also serve as the preoperational baseline for Unit 2. These programs will then be continued at least through the first year of two-unit operation. Based on the data obtained, a decision will be made whether to continue fullscale studies another year or more. The statistical adequacy of the data for demonstrating possible Project-related disturbances and the "normalcy" of the physical environment will be considered in this decision.

Some reduction in the number of sampling locations and sampling frequency may be permissible at the end of the first year; however, sampling at least twice a year (April and August) probably will continue for a minimum of two additional operating years at most of the preoperational sampling locations (Table C-5.1).

Both locations directly in line with Project discharge and appropriate control locations will be sampled five times a year at least though the first Unit 1 shutdown for refueling to detect any adverse impact on aquatic communities that may have adapted to the effluent. This includes the pipeline (SL 4) and Shake Mill (SL 6) locations on the Skagit River (Figure C-1.1).

When Unit I initial operation begins, a long-term data base of various ecological parameters will have been accumulated for these locations. These data will include two full annual cycles and several years of replicated studies at two critical times in the year (April and August). This extensive background information on the areas potentially most vulnerable to Project operation effects should permit detection of subtle as well as obvious ecosystem changes.

In addition, data will have been gathered for several years on the spawning of anadromous salmonids in several small creeks in the vicinity of the Plant Site. The stream surveys for spawning salmonids will continue at least through one spawning cycle to evaluate any changes in spawning behavior.

5.2 Additional Operational Studies - Discharge

The design of the diffuser and the small volume of Project discharge relative to river flow make it unlikely that the effects of the effluent will be measurable at the nearest aquatic biota

sampling locations described above. Therefore, additional studies will focus on localized regions (downstream of mixing zone) where the influence of the discharge may be measurable on shoreline or river bottom areas.

Phytoplankton: Because of the low phytoplankton densities in the Skagit River, it probably will not be possible to demonstrate any measurable effects from their brief residence-time in the plume.

Periphyton: Periphyton growth in areas where measurable influence of the discharge may contact shorelines or the river bottom (surface, midway, bottom) at each of the sampling locations will be measured using glass slides exposed for 4- and 8-week intervals during the first year of operation of each unit. Processing and calculations will be done as in the continuing program. Results will provide a measure of periphyton growth stimulation (if any) from the combined effects of thermal and nutrient enrichment.

Zooplankton: Zooplankton densities in the Skagit River are extremely low and the number captured would be insufficient to reliably monitor the expected negligible influence of the Project effluent. However, zooplankton tows (5-minute) will be conducted above, in, and below the plume as part of the continuing studies.

Aquatic Invertebrates: Some changes probably will occur in species composition or timing of critical life history phases for benthic invertebrates where measurable influence of the discharge contacts the shoreline or river bottom. Potential effects on aquatic invertebrates will be investigated on artificial substrata placed in these areas.

Fish: The effluent's effects on the fish expected to pass through the plume is expected to be slight.

Electrofishing and seining will be conducted upstream and downstream of the discharge (SL 4, and 6) as part of the continuing monitoring program. Attempts also will be made to conduct these operations in the plume itself to check avoidance of, or attraction to, various regions of the plume. The feasibility of such operations, however, is dictated by water depth and velocity.

After the effluent passes through the diffuser, it is reasonable to assume that fish will not be affected by it. However, laboratory bioassays on several important fish and invertebrates will be conducted using several dilutions of various Project effluents. Median tolerance limit (LD 50) for 24-, 48-, and 96-hour exposure will be determined and the incipient lethal level (the concentration that can be tolerated indefinitely by the species in question) will be estimated. These tests will be duplicated at various temperatures (5 to 25°C) to measure the combined effects of chemical and thermal discharge. Samples of Project effluent will be diluted with receiving waters and heated or cooled to achieve the desired water conditions.

If potentially harmful conditions are found to exist at temperatures and concentrations found in the Project discharge water, other studies may be initiated to assess the impact on fish in the river, as the Council may determine.

5.3 Additional Operational Studies - Intake

Studies will be initiated to investigate the behavior of juvenile salmonids near the Ranney Collectors (SL 1a). Although no entrainment or impingement of fish is anticipated, bi-weekly sampling of the Ranney Collector caissons will be conducted during the first spring of one-unit operation and during the first spring of two-unit operation. One additional spring's study shall be added to each test if the initial study fails to coincide with migration of all significant fish species.

TABLE C-5.1

Sheet 1 of 2

AQUATIC MONITORING

Parameters	Sampling Frequency	Sampling Method	Sampling Locations (1)	Analyses
Periphyton	5/yr	Fixed artificial substrata	1a, 4, 6, 9a, 10	Algal cells/mm ² -day
Phytoplankton	5/yr	Direct cell count	1a, 4, 6	Algal cells/ml water
Zooplankton	5/yr	Plankton net two	1a, 4, 6	Organisms/meter ³
Macro-invertebrates	5/yr	Multiple plate	4 (2)	Total organisms/unit area by taxonomic group
	5/yr	Basket substrata	4 (2)	Total organisms by taxonomic group
	5/yr	Stream drift nets	1a, 4, 6, 9a, 10	Total biomass and number of organisms/hr by taxonomic group
	5/yr	Natural bottom samples (3)	1a, 4, 6, 9a, 10	Total biomass and number of organisms per cm ² bottom area, by taxonomic group
Copper, Zinc, Chromium	Annual	Tissue Analysis	1a, 6	Muscle, Kidney Liver

(1) See Figure C-1.1

(2) Multiple plate and basket artificial substrata will be placed in areas where the measurable influence of the discharge is most likely to contact the streambed or shoreline as determined by the plume definition study. Controls will be placed outside the plume area.

TABLE C-5.1

Sheet 2 of 2

Parameters	Sampling Frequency	Sampling Method	Sampling Locations (1)	Analyses
Vertebrates (fish)	5/yr (3)	Beach seine (three sets; 100-ft seine)	1a, 4, 6	Age, length, weight, total numbers, biomass by species/set
	5/yr (3, 4)	Electrofishing	1a, 4, 6, 9a, 10	Age, length, weight, total numbers, biomass by species, population estimates (creek locations)
	Biweekly October-February	Coho spawning survey	Tank, Wiseman, Sorenson Cr.	Number, sex, number of redds
	During Unit 1 and 2 operations	Laboratory bioassays	-	24-, 48-, 96-hr LD 50 of blowdown at several temperatures
	During Unit 1 and 2 operations if bioassays suggest problem may exist	Other tests as required	As required	Survival to plume exposure
	During Unit 1 and 2 operations	Visual inspection of stream bank and Ranney caissons	1a	Impingement or entrainment in intake system

- (3) Once satisfactory evidence is gathered that Ranney Collection operation does not affect juvenile fish these studies will be discontinued at SL 1a.
- (4) No impacts on Wiseman or Tank Creeks are expected to result from Project operation. Hence, these studies will be conducted 5/yr in the Unit 1 pre-fuel loading year and in the first Unit 2 operational year and 2/yr (April and August) in the interim unless there is an indication of some Project-related impact (e.g., anomalous water quality readings).